



Porting Linux to Cortex-M7 microcontroller

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\$ whoami

Name : Toshifumi NISHINAGA

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Position : Master's student

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Achievement:

Wrote digital book 「 BareMetal で遊ぶ Raspberry Pi 」

Join in Security Camp (2013 student, 2014-2015 tutor)

Internship: FCT, RikenAICS, Fujitsu, AXE

Kernel/[VM@Hokuriku](#) organizer

Joined in internship

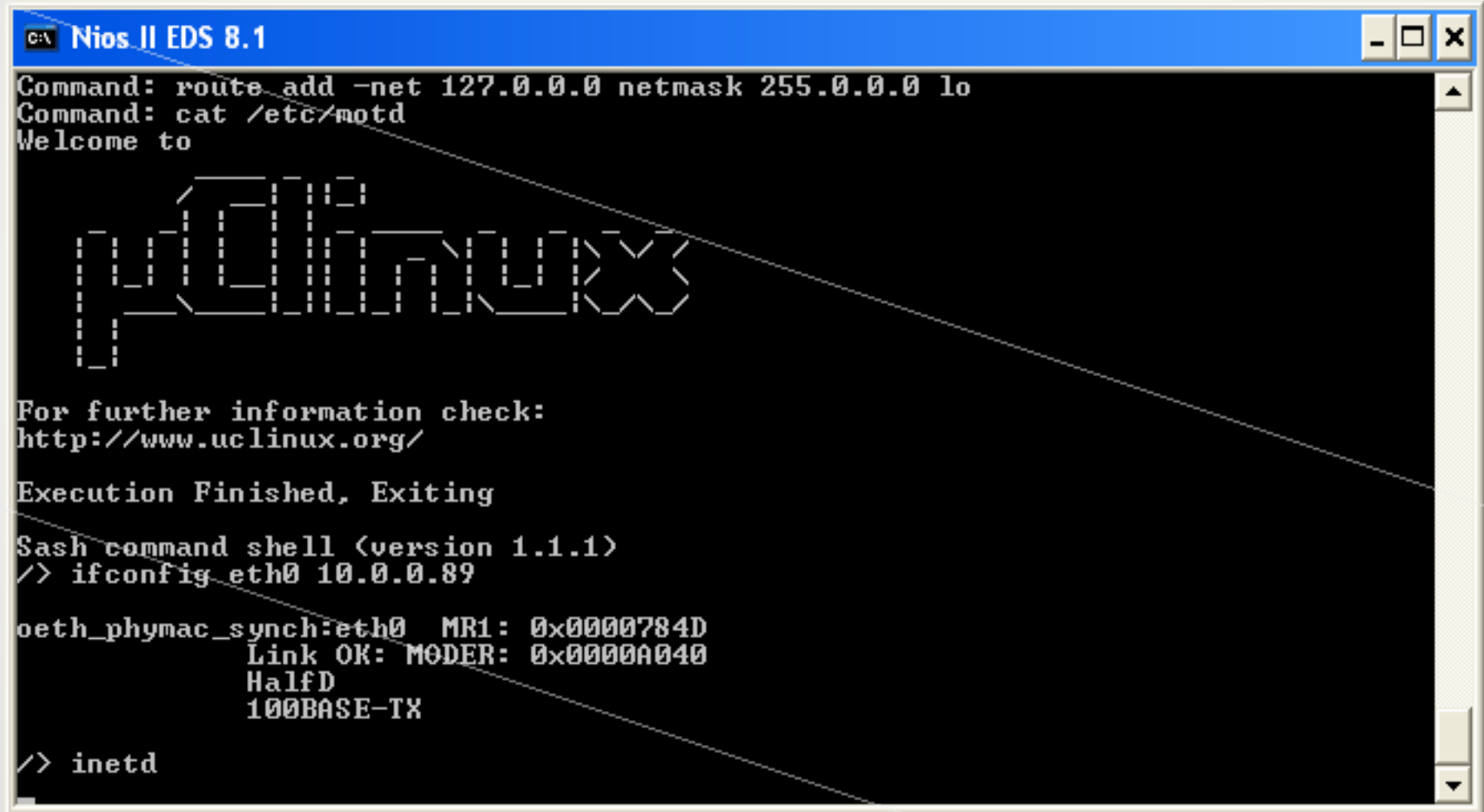
- Company : Fujitsu Computer Technologies(FCT)
- Period : two-week
- Theme : Porting Linux to Cortex-M7 microcontroller

SoC	STM32F746NG
Flash	1-MB
RAM	340-KB
D-Cache, I-Cache	4-KB
External SDRAM	128-bit(64-Mbit accessible)
Pipeline	6-stage, super-scaler



<http://www.st.com/web/en/catalog/tools/FM116/SC959/SS1532/LN1848/PF261641?sc=stm32f7-discovery>

Ideal



```
C:\ Nios II EDS 8.1
Command: route add -net 127.0.0.0 netmask 255.0.0.0 lo
Command: cat /etc/motd
Welcome to

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For further information check:
http://www.uclinux.org/

Execution Finished, Exiting

Sash command shell (version 1.1.1)
/> ifconfig eth0 10.0.0.89

oeth_phymac_synch:eth0 MR1: 0x0000784D
      Link OK: MODER: 0x0000A040
      HalfD
      100BASE-TX

/> inetd
```

Actually

```
[ 0.010000] Calibrating delay loop... 385.84 BogoMIPS (lpj=1929216)
[ 0.130000] pid_max: default: 4096 minimum: 301
[ 0.130000] Mount-cache hash table entries: 1024 (order: 0, 4096 bytes)
[ 0.130000] Mountpoint-cache hash table entries: 1024 (order: 0, 4096 bytes)
[ 0.170000] devtmpfs: initialized
[ 0.210000] clocksource: jiffies: mask: 0xffffffff max_cycles: 0xffffffff, max_idle_ns: 1911
2604462750000 ns
[ 0.330000] clocksource: Switched to clocksource arm_system_timer
[ 0.570000] io scheduler noop registered (default)
[ 0.570000] STM32 USART driver initialized
[ 0.570000] 40011400.serial: ttyS0 at MMIO 0x40011400 (irq = 17, base_baud = 6250000) is a s
tm32-usart
[ 0.830000] console [ttyS0] enabled
[ 0.880000] List of all partitions:
[ 0.890000] No filesystem could mount root, tried:
[ 0.900000] Kernel panic - not syncing: VFS: Unable to mount root fs on unknown-block(1,0)
[ 0.900000] ---[ end Kernel panic - not syncing: VFS: Unable to mount root fs on unknown-blo
ck(1,0)
[ 55.180000] random: nonblocking pool is initialized

[0] 0: bash 1: bash 2: bash 3: sudo* 4: bash- 5: bash 6:> "tnishinaga-FMVDG4N0E1" 18:36 18-Feb-16
```

Current progress...

- Done
 - Add DeviceTreeScript(DTS)
 - Fix STM32 USART driver
 - Fix arch/arm/mm/proc-v7m.S
 - Insert NOP(x4) between “cpsie” and “svc”(cause is 6-stage pipeline ?)
- TODO
 - Make tiny rootfs
 - D&I-Cache support
 - 200MHz clock mode support
 - Make DT supported tiny bootloader
 - Cleanup code

Next

- Commit code to community
- Send proposal to Google Summer of Code and process TODO.